LISTING OF THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 (Currently Amended) A method for analyzing a potential cause of a change in a service, wherein service quality of the service is monitored, usage of the service is measured, and service events are detected, the method comprising:

determining a service change time window based at least in part upon a change in service quality between a first working state and a second, non-working state, and upon a change in service usage amount, the service change time window encompassing at least part of a service outage;

retrieving data representing a plurality of detected events and a-corresponding times in which the events occurred; and

computing a probability for each of the detected events that each of the detected events caused the service change based at least in part on a correlation between the event time and the service change time window.

2. (Original) The method of claim 1, wherein determining the service change time window comprises determining a service failure time window based upon the change in service quality and narrowing the service failure time window to the service change time window based upon the service usage amount measured during that service failure time window.

3. (Original) The method of claim 2, wherein the service quality is monitored through periodic polling of the service quality, and comprising determining the service failure time window as bounded by a polled point of the first working state and a polled point of the second, non-working state.

4. (Original) The method of claim 1, wherein computing the probability comprises computing the probability using at least in part a time weighting function which decreases exponentially with the distance between the event time and the service change time window.

5. (Currently Amended) The method of claim 1, comprising determining whether one or more other events of a type identical to one of the detected events occurred, and wherein computing the probability comprises computing the probability using at least in part a false occurrence weighting function which decreases the probability of the detected event as the cause of the service change for instances in which the detected event occurred outside the service change time window.

6. (Currently Amended) The method of claim 1, comprising storing historical data associating occurrences of prior events with prior service changes, and wherein computing the probability that one of the detected events caused the service change comprises computing the probability based at least in part on the historical data.

7. (Original) The method of claim 6, wherein storing historical data comprises storing data representing instances in which prior events occurred within prior service change time windows, and wherein computing the probability that the detected event caused the service change comprises using at least in part a positive occurrence weighting function which increases the probability of the detected event as the cause of the service change based on instances in the historical data in which a prior event of a type identical to the detected event occurred within a prior service change time window.

8. (Original) The method of claim 6, wherein storing historical data comprises storing data representing instances in which prior events were identified as having caused prior service changes, and wherein computing the probability that the detected event caused the service

change comprises using at least in part a historical weighting function which increases the

probability of the detected event as the cause of the service change based on instances in the

historical data in which a prior event of a type identical to the detected event was identified as

having caused a prior service change.

9. (Cancelled)

10. (Currently Amended) The method of claim <u>10</u> 9, wherein computing probabilities

comprises computing the probabilities such that the total of all computed probabilities is 1.

11. (Currently Amended) The method of claim 1, wherein the service comprises service

over a communication network and wherein the detected event<u>s include</u> comprises a network

event.

12. (Currently Amended) The method of claim 1, wherein the service comprises service

provided by an application program and wherein the detected event<u>s include</u> comprises an

application program event.

13. (Original) The method of claim 1, wherein the service change is a service outage,

comprising determining the service change time window as a change in service quality from the

first working state to the second, non-working state.

14 (Original) The method of claim 1, wherein the service change is a service recovery,

comprising determining the service change time window as a change in service quality from the

second, non-working state to the first, working state.

15 (Original) The method of claim 1, wherein determining the service change time

window comprises detecting a change in service quality by detecting a step change in measured

usage.

16 (Currently Amended) A method for analyzing potential causes of a service change, the method comprising:

determining a service change time window encompassing a change of service between a first working state and a service outage, the service change being determined at least in part based on measured service usage levels;

detecting occurrences of a set of events;

retrieving data representing the plurality of detected events and corresponding times in which the events occurred, wherein the set of events are within a given time prior to and during the service change time window, each occurrence of an event being associated with a time at which the event occurred; and

computing a probability distribution for the set of events, which probability distribution determines for each event in the set the probability that the detected event caused the service change, the probability distribution being based at least in part on relations between the time of each event occurrence and the service change time window.

17. (Original) The method of claim 16, wherein computing the probability distribution for the set of events comprises computing the probability distribution using a first weighting function which is the product of two or more second weighting functions.

18. (Original) The method of claim 16, wherein the two or more second functions are selected from the group consisting of:

a time weighting function which decreases exponentially the probability of a given event as the cause of the service change with the distance between the given event time and the service change time window;

a false occurrence weighting function which decreases the probability of a given event as the cause of the service change for instances in which events of the same type as the given event occurred outside the service change time window;

a positive occurrence weighting function which increases the probability of a given event as the cause of the service change based on instances stored in a historical database in which events of the same type as the given event occurred within a prior service change time window; and

a historical weighting function which increases the probability of a given event as the cause of the service change based on instances in the historical database in which events of the same type as the given event were identified as having caused a prior service outage.

19. (Original) The method of claim 18, wherein the step of computing the probability distribution comprises using a first weighting function which is the product of the time weighting function, false occurrence weighting function, positive occurrence weighting function, and user weighting function.

20. (Original) The method of claim 16, comprising monitoring service quality, and wherein determining the service change time window comprises determining a service failure time window based upon a change in monitored service quality and narrowing the service failure time window to the service change time window based upon the service usage amount measured during that service failure time window.

21. (Original) The method of claim 20, wherein the service quality is monitored through periodic polling of the service quality, and comprising determining the service failure time window as bounded by a polled point of the first working state and a polled point of the second, non-working state.

22. (Original) The method of claim 16, comprising computing the probability distribution such that the total of all probabilities in the distribution is 1.

23. (Original) The method of claim 16, wherein the service comprises service over a communication network and wherein the detected events comprise network events.

24 (Original) The method of claim 16, wherein the service comprises service provided by an application program and wherein the detected events comprise application program events.

25 (Original) The method of claim 16, wherein the service change is a service outage, comprising determining the service change time window as a change in service from the first working state to the second, non-working state.

26 (Original) The method of claim 16, wherein the service change is a service recovery, comprising determining the service change time window as a change in service from the second, non-working state to the first, working state.

27 (Previously Presented) The method of claim 16, wherein determining the service change time window comprises detecting a step change in measured usage.

28 (Currently Amended) A network monitoring system comprising:

a service monitor for monitoring quality of service on the network;

a usage meter for measuring usage of the network;

an event detector for detecting a plurality of network events and corresponding times at which the network events occur; and

a probable cause engine, coupled to receive data from the service monitor, usage meter, and the event detector, the probable cause engine including a processing device that, in response to executable instructions, is operative to, for:

set ~~setting~~ a service change time window based upon data received from the

service monitor or usage meter, the service change time window encompassing at least part of an

occurrence of a service outage in the network; and

determine ~~determining~~ which of the network events detected by the event detector

is the most likely cause of a service change ~~based at least in part of the relations of the detected~~

~~network event times to the service change time window~~ including computing a probability for

each of the detected events that each of the detected events caused the service change based at

least in part on a correlation between the event time and service change time window.

29. (Currently Amended)   A computer readable medium storing program code for,

when executed, causing a computer to perform a method for analyzing a potential cause of a ~~an~~

change in a service, wherein service quality of the service is monitored, usage amount of the

service is measured, and service events are detected, the method comprising:

determining a service change time window based at least in part upon a change in

service quality between a first working state and a second, non-working state, and upon a change

in service usage amount, the service change time window encompassing at least part of a service

outage;

retrieving data representing a plurality of detected events and ~~a~~ corresponding

times in which the events occurred; and

computing a probability for each of the detected events that each of the detected

events caused the service change based at least in part on a correlation between the event time

and the service change time window.

30. - 61. (Cancelled)

62. (Currently amended)   Computer readable media comprising program code that, when executed by a programmable microprocessor, causes the programmable microprocessor to execute a method for analyzing potential cause of a service change, the method comprising:

determining a service change time window encompassing a change of service between a first working state and a service outage, the service change being determined at least in part based on measured service usage levels;

detecting occurrences of a sert of events;

retrieving data representing the plurality of detected events and corresponding times in which the events occurred, wherein the set of events are within a given time prior to and during the service change time window, each occurrence of an event being associated with a time at which the event occurred; and

computing a probability distribution for the set of events, which probability distribution determines for each event in the set the probability that the detected event caused the service change, the probability distribution being based at least in part on relations between the time of each event occurrence and the service change window.

63. (Previously presented)   The computer readable media comprising program code of claim 62 that, when executed by a programmable microprocessor, causes the programmable microprocessor to execute a method for analyzing potential cause of a service change, wherein computing the probability distribution for the set of event comprises computing the probability distribution using a first weighting function which is the product of two or more second weighting functions.

64. (Previously presented)   The computer readable media comprising program code of claim 63 that, when executed by a programmable microprocessor, causes the programmable

microprocessor to execute a method for analyzing potential cause of a service change, wherein the two or more second functions are selected from the group consisting of:

a time weighting function which decreases the probability of a given event as the cause of the service change with the distance between the given event time and the service change time window;

a false occurrence weighting function which decreases the probability of a given event as the cause of the service change for instances in which events of the same type as the given event occurred outside the service change time window;

a positive occurrence weighting function which increases the probability of a given event as the cause of the service change based on instances stored in a historical database in which events of the same type as the given event occurred within a prior service change time window; and

a historical weighting function which increases the probability of a given event as the cause of the service change based on instances in the historical database in which events of the same type as the given event were identified as having caused a prior service outage.

65. (Previously presented)   The computer readable media comprising program code of claim 62 that, when executed by a programmable microprocessor, causes the programmable microprocessor to execute a method for analyzing potential cause of a service change, the method comprising monitoring service quality, an wherein determining the service change time window comprises determining a service failure time window based upon a change in monitored service quality and narrowing the service failure time window to the service change time window based upon the service usage amount measured during the service failure time window.

66. (Previously presented)   The computer readable media comprising program code of claim 62 that, when executed by a programmable microprocessor, causes the programmable microprocessor to execute a method for analyzing potential cause of a service change, the method comprising computing the probability distribution such that the total of all probabilities in the distribution is 1.

67. (Previously presented)   The computer readable media comprising program code of claim 62 that, when executed by a programmable microprocessor, causes the programmable microprocessor to execute a method for analyzing potential cause of a service change, wherein the service comprises service over a communication network and wherein the detected events comprise network events.

68. (Previously presented)   The computer readable media comprising program code of claim 62 that, when executed by a programmable microprocessor, causes the programmable microprocessor to execute a method for analyzing potential cause of a service change, wherein the service comprises service provided by an application program and wherein the detected events comprise application program events.

69. (Previously presented)   The computer readable media comprising program code of claim 62 that, when executed by a programmable microprocessor, causes the programmable microprocessor to execute a method for analyzing potential cause of a service change, wherein the service change is a service outage, comprising determining the service change time window as a change in service from the first working state to the second, non-working state.

70. -- 77. (Cancelled)